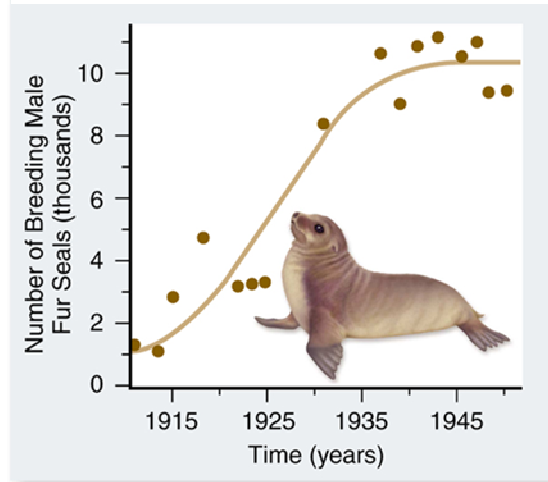


# Chapter 55 – Population Ecology



1. Define **ecology**. \_\_\_\_\_

\_\_\_\_\_

2. List the four key variables that characterize the environment in which an organism lives.

a. \_\_\_\_\_

c. \_\_\_\_\_

b. \_\_\_\_\_

d. \_\_\_\_\_

3. In coping with environmental changes organisms have evolved two distinct approaches. Characterize each. Give an example of each.

a. **Endotherm** (regulator) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

b. **Ectotherm** (conformer) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Define **population**. \_\_\_\_\_

\_\_\_\_\_

5. List the 3 characteristics that can be used to describe a population.

a. \_\_\_\_\_

c. \_\_\_\_\_

b. \_\_\_\_\_

6. List some of the factors that determine the range of a population of organisms. (In effect, explain why polar bears are found in the Arctic but not in the tropical rainforest).

---

---

7. Describe three patterns of population distribution.

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

8. **Application:** One species of birds is highly territorial, while a second lives in flocks. What is each species' likely pattern of dispersion? **Explain.**

---

---

---

9. Define **demography**. \_\_\_\_\_

---

10. Describe how each of the following factors affect population growth rates.

a. Sex ratio \_\_\_\_\_

---

b. Generation time \_\_\_\_\_

---

c. Age structure \_\_\_\_\_

---

11. What are life tables used for in population studies? \_\_\_\_\_

---

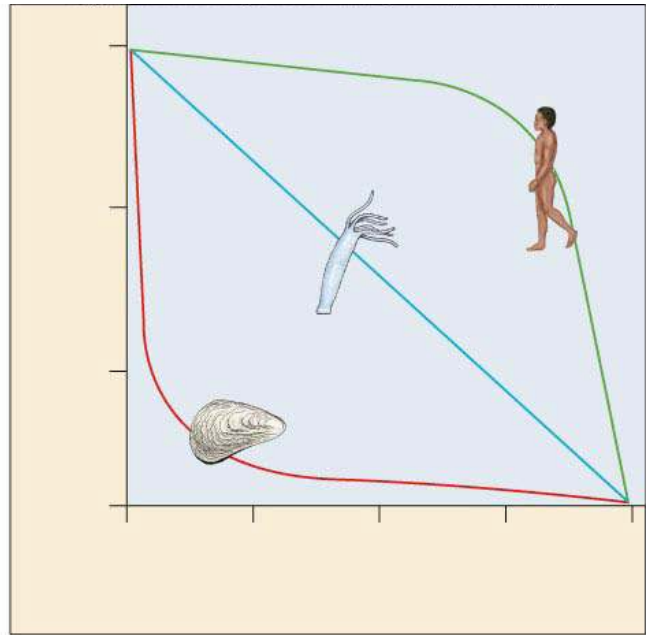
12. Compare the survival strategies of species and give an example of each type.

**Type I** \_\_\_\_\_

**Type II** \_\_\_\_\_

**Type III** \_\_\_\_\_

13. Label the **survivorship curves** diagram:



14. Life history adaptations involve many trade-offs between the cost of reproduction and the investment in survival. **Explain** this statement.

---

---

---

15. Briefly describe the trade-offs with respect to each of these factors.

a. Investment per offspring \_\_\_\_\_

---

b. Reproductive Events per Lifetime \_\_\_\_\_

---

c. Age at First Reproduction \_\_\_\_\_

---

16. **Application:** Consider two rivers — One is spring fed and is constant in water volume and temperature year-round; the other drains a desert landscape and floods and dries out at seasonal intervals. Characterize the likely reproductive strategy of the animals in each environment (semelparity vs. iteroparity). **Explain.**

---

---

17. Define **biotic potential**.

---

---

18. Explain why the exponential growth curve produces a “J-shaped” curve instead of a straight line.

---

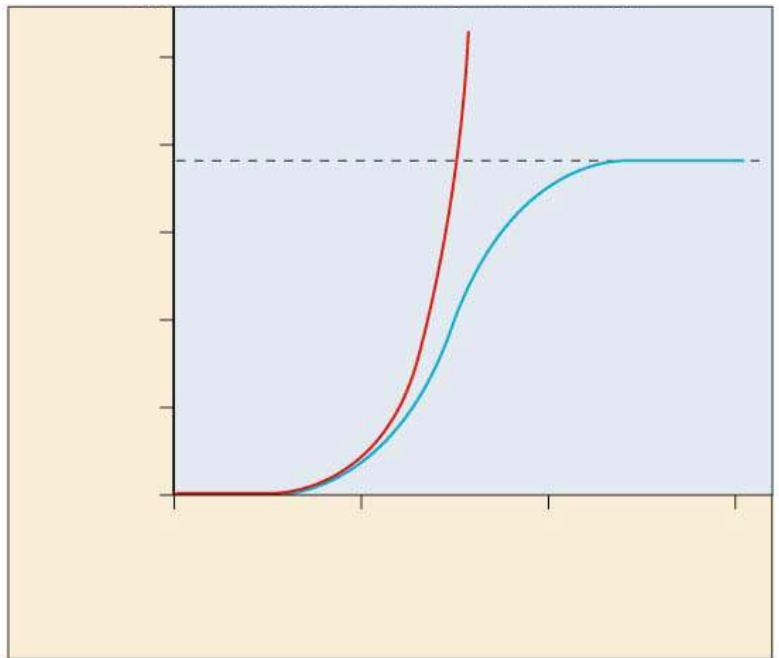
---

19. Explain why an exponential growth curve is rarely seen in nature. Give examples of when it is likely to occur.

---

---

20. Label the graph illustrating the two models of population growth.



21. Define **carrying capacity**

---

---

---

22. Write the formula for population growth without limits. Define the terms.

---

---

23. Write the formula for population growth with limits. Define the terms.

---

---

24. What happens to a population when the number of individuals approaches carrying capacity?

---

---

25. Identify factors that regulate population size.

---

---

26. Compare **density-independent** and **density-dependent** factors limiting populations.

---

---

27. Compare K-selected to r-selected species. Give examples of each.

a. **K-selected** \_\_\_\_\_

---

---

b. **r-selected** \_\_\_\_\_

---

---

28. Look at the growth curve of the human population. How does it compare to the growth curves earlier in the chapter?

---

---

---

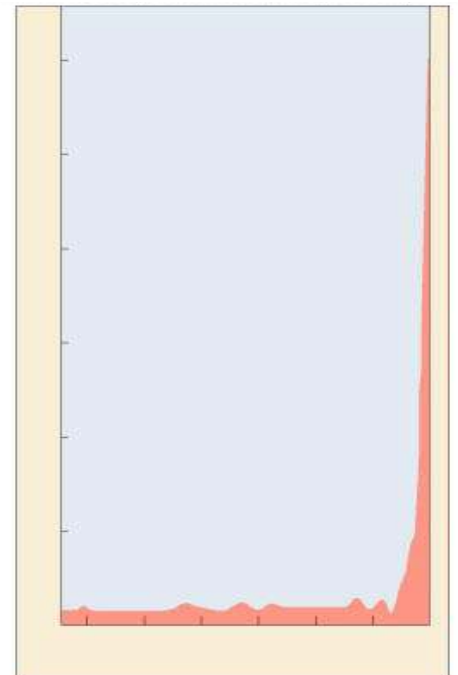
---

29. Have humans reached carrying capacity? What factors are significant when explaining our growth curve? Label the graph.

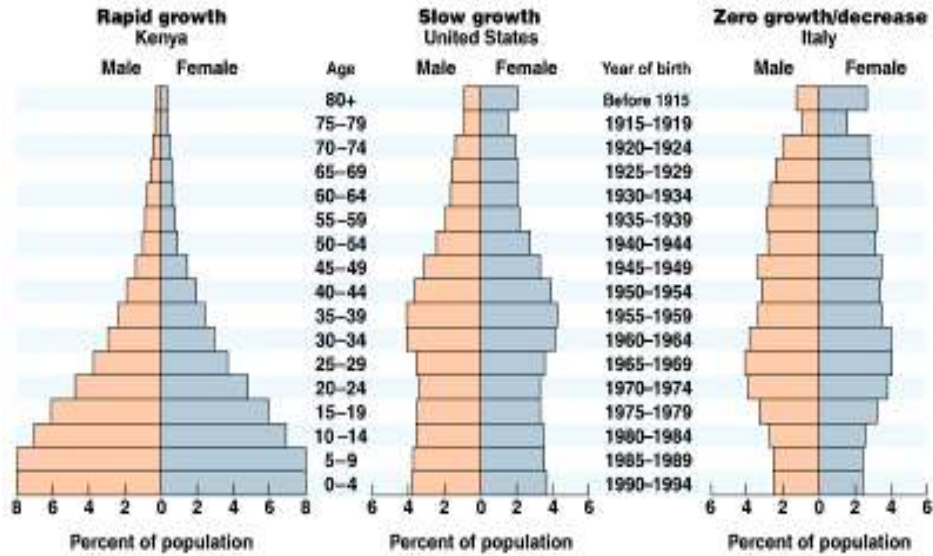
---

---

---



30. Look at the age structure diagrams (population pyramids) of different countries. What will the population distributions look like in 20 years? **Application:** How might the age structure influence policy?



31. Explain ecological footprint.

32. Explain the significance of this diagram.

**Application:** What is the more significant cause of resource depletion— overpopulation or overconsumption?

